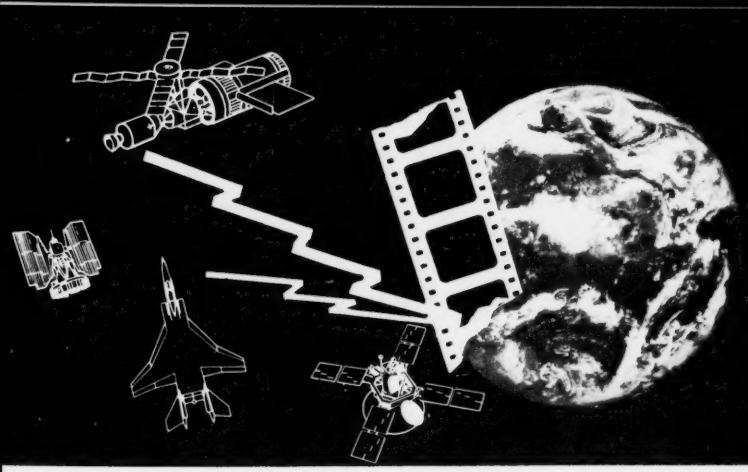
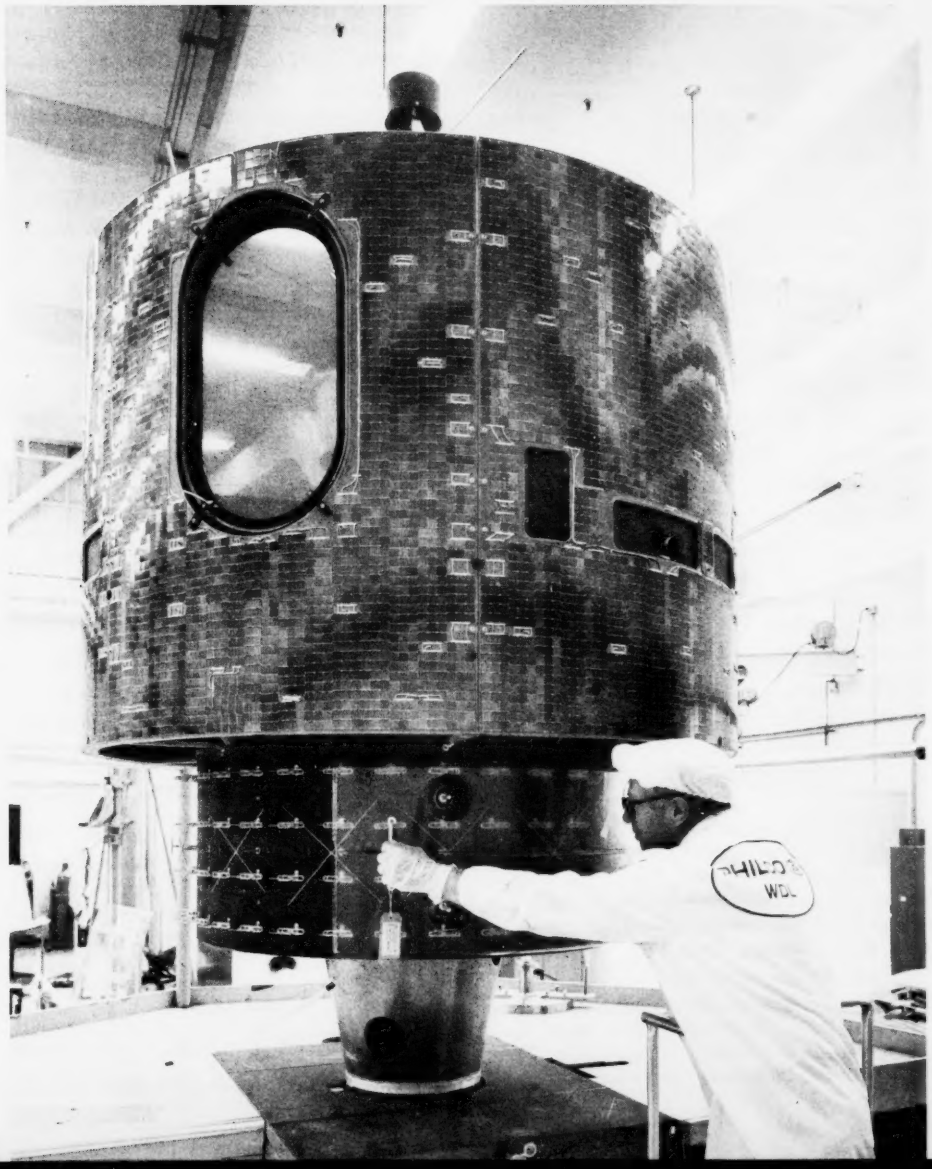


# NASA ACTIVITIES

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

May 15, 1974 Vol. 5, No. 5



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# LETTER FROM WASHINGTON

May 3, 1974

Dear Colleagues:

Several impending events, including important design decisions and choice of a contractor team to proceed with Spacelab development, make this an appropriate time to comment on the excellent progress being made in the Spacelab program; on the great potential value of Spacelab as an integral element of the Shuttle-based Space Transportation System we will be using in the 1980s and 1990s; and on the special significance of Spacelab as a major international undertaking to make the exploration and use of space a common venture of mankind.

Spacelab is a multipurpose laboratory facility for use in the Shuttle cargo bay during orbital operations to support a broad spectrum of scientific and applications experiments and eventually commercial space processing operations. We expect Spacelab, like the Shuttle, to become a major factor in reducing the costs of exploring and using space.

I plan to meet in Paris on May 20 with Dr. Alexander Hocker, Director General of the European Space Research Organization (ESRO) and

**COVER**

**SMS weather satellite undergoing final tests in readiness for launch now set for May 16.**

my opposite number in overall planning for Spacelab and other joint undertakings of ESRO and NASA. Dr. Hocker and I will discuss the design characteristics of Spacelab as they are now shaping up and ESRO's selection of the multinational industrial contractor team that will build Spacelab. We will also discuss planning for the first Spacelab mission, which will be flown to Earth orbit and back by the Space Shuttle in 1980. Our agenda, I think, gives you a good idea of the substantial progress we and our European colleagues have already made in carrying out the Spacelab program.

NASA and ESRO began serious discussions as far back as 1969 on how they might cooperate effectively on major "post-Apollo" programs. At first we thought the Europeans might build part of the Shuttle itself, but then it became clear that European responsibility for design and development of Spacelab was a far better idea.

Firm agreements were signed last year by nine European governments and ESRO, and by ESRO and NASA, on funding, goals, and division of responsibilities for Spacelab. The European countries participating are Germany, Belgium, Denmark, Spain, France, Italy, the Netherlands, the United Kingdom, and Switzerland. They have made a firm commitment to invest around $400 million in Spacelab's design and development. Two international teams headed by German firms have completed the Phase B studies for Spacelab, and one of these teams will be chosen by ESRO to carry out Phase C/D of the program. The competition between these two teams has been keen, I understand, and various concepts for Spacelab design have been carefully considered.

This competition in Europe, plus NASA's inputs based on our experience in Apollo, Skylab, and Shuttle, assure us that Spacelab will be a well designed facility and a worthy "teammate" of the Shuttle.

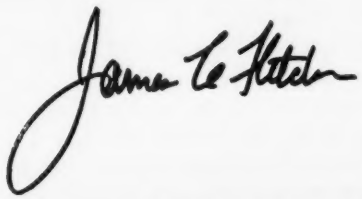
I would also like to point out that intensive efforts are being made, in this country and in Europe, to assure that Spacelab will meet the needs of potential users—in science and industry —to the greatest extent possible. The more different kinds of users we can find for Spacelab the better.

Interesting details on how the Spacelab effort has been organized on both sides of the Atlantic were given in recent Congressional testimony by Douglas Lord, Director of the Spacelab program at NASA Headquarters, and Jean-Pierre Causse, who has until recently headed the Spacelab program for ESRO and who has now taken an important position in French industry. More details on the concepts chosen as a result of design competitions will be available soon. I hope a full and up-to-date description of plans for Spacelab can be given in NASA ACTIVITIES in the next several months.

In closing, I would like to quote from Mr. Causse's statement to Congress. I think it will interest NASA people to see how the Europeans view their most ambitious space development effort to date, and their close working relations with us:

". . . I am pleased to report that in ESRO's opinion the Spacelab programme is at present in a very healthy situation. Its importance for the future is now well understood in Europe, and there is considerable interest in the programme. There is a firm commitment on behalf of a large number of European Governments to ensure its completion within an enlarged European space programme. ESRO and European industries have progressed towards the establishment of strong and competent teams. We have come to an understanding of the technical problems associated with the Spacelab definition, in particular those related to future operations, and we work within adequate funding. It is my pleasure to add here that we have developed with NASA a very close and efficient cooperation, which is doubtless one of the keys to the success of this programme and therefore to the success of the total new Space Transportation System."

Sincerely,



JAMES C. FLETCHER
*Administrator*

REVIEW BOARD IN SESSION—Lower reporting costs was the main topic of conversation at these two sessions of the Reports Review Board. At left is shown the March meeting and at right that in April. Seated clockwise around the table in the first of these are Herbert J. Fivehouse, GSFC; Ray Crouch, MSFC; Boyd C. Myers, II, Headquarters; Louis H. Brennwald, ARC; Anthony M. Pearson, JPL; William Kelly, JSC; and George Van Staden, KSC. In the second, clockwise, are shown Marvin G. Wallis, Headquarters; Robert H. Kirby, LaRC; Merrill H. Mead, ARC; William Porter, JPL; Clinton L. Taylor, JSC; Fred Boles, KSC; Robert P Craven, Headquarters; Victor Gordon, LeRC; Philip E. Walker, FRC; William E. Mathis, GSFC; Ray Crouch, MSFC; Chris Floyd, Wallops Flight Center; and Boyd C. Myers, II, Headquarters.

## NASA OFFICES LAUNCH ACTIVE ATTACK ON REPORTING COSTS

*Review Board Holds two Busy Sessions; Annual Saving of $1.25 Million Already Realized*

A direct attack on reporting costs within the space agency, launched last year by direction of Dr. George M. Low, Deputy Administrator of NASA and Associate Administrator for Center Operations, already has resulted in a total annual cost saving of $1.25 million.

In launching the action, Dr. Low requested each Headquarters office to review its reporting requirements during FY 1974. He also established a goal of reducing reporting costs on 523 reports by at least 50 per cent, or $2.45 million, by June 30 of this year.

By the middle of April, 167 reports had been canceled, while 62 others had cost savings associated with reductions in frequency, in distribution, and in elimination of overlap.

At the start of the campaign, annual cost of Headquarters reports was estimated at nearly $5 million. By the end of February of this year, the offices, as a part of their annual report review process, had reduced their costs by approximately $675,000 and had canceled 48 reports.

At the suggestion of Langley Research Center, however, a second phase of the reduction program was initiated in March by establishing a Reports Review Board, chaired by Headquarters personnel, but with principal membership from the installations. This board reviewed each report in the system for possible cancellation, or for cost savings that could be realized by reducing frequencies and copy distribution, or by other system improvements.

### Two Sessions Held

The Review Board met in Washington during two week-long sessions in late March and early April. Dr. Low and Edwin C. Kilgore, assisting the former in his role as Associate Administrator for Center Operations, served successively as chairmen during the opening session. Boyd C. Myers, II, Assistant Associate Administrator for the Office of Organization and Management, presided during the remainder of the time. Installations were represented by top-level officials, who took active part in the questioning process.

Preliminary savings directly attributed to the Review Board deliberations are estimated at $570,000. During the two sessions, 523 reports were reviewed and 99 of them were canceled.

Further reductions will be necessary during the

remaining months of FY 1974 in order to meet the goal set by Dr. Low. Plans are now underway to contact other federal agencies for the purpose of negotiating a reduction in the reporting requirements they make of NASA. It is estimated the annual costs of responding to these requests is $600,000, involving approximately 200 reports.

Other NASA installations have had active campaigns throughout the fiscal year to reduce their annual reporting costs. Kennedy Space Center plans to adopt some of the successful techniques used in the Headquarters campaign, including the Review Board approach. Goddard Space Flight Center, meanwhile, is preparing to review an estimated 1,400 of its reporting requirements.

### Review Board Members

Members of the Review Board follow:

Headquarters—George M. Low, Edwin C. Kilgore, Boyd C. Myers, II, and Frank Hoban.

Ames Research Center—Louis H. Brennwald and Merrill H. Mead.

Flight Research Center—E. H. Mortensen and Philip E. Walker.

Goddard Space Flight Center—Robert Amoroso, Herbert J. Fivehouse, William E. Mathis, William Mecca and Richard J. Powell.

Jet Propulsion Laboratory—John Baylis, Anthony M. Pearson and William Porter.

Johnson Space Flight Center—William Kelly and Clinton M. Taylor.

Kennedy Space Center—Fred Boles, Charles E. Mason and George Van Staden.

Langley Research Center—Robert H. Kirby, Raymond Romatowski, Robert S. Walton, III, and William Williams.

Lewis Research Center—Victor Gordon.

Marshall Space Flight Center—Ray Crouch and J. N. Foster.

Wallops Flight Center—Chris Floyd and Joseph E. Robbins.

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Effective April 26, Wallops Station located on Wallops Island, Virginia, was renamed the Wallops Flight Center.

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Sunday drive-through tours of Cape Canaveral Air Force Station and Kennedy Space Center, suspended last November in support of the national fuel conservation program, were resumed April 7.

## SCHNEIDER SELECTED BY NAA TO RECEIVE COLLIER TROPHY

*Skylab Program Is Hailed as Outstanding Aerospace Event of 1973*

William C. Schneider, Director of the Skylab Program, and members of the three Skylab crews have been designated by the National Aeronautic Association to receive the Robert J. Collier Trophy for their individual accomplishments in not only making Skylab the outstanding aerospace event of 1973, but also for dramatically demonstrating that man can live well and work effectively in space.

Schneider will accept the Trophy on behalf of the entire Skylab organization at a dinner to be hosted jointly in Washington on June 4 by NAA and the National Aviation Club. The presentation will be made by the Vice President of the United States.

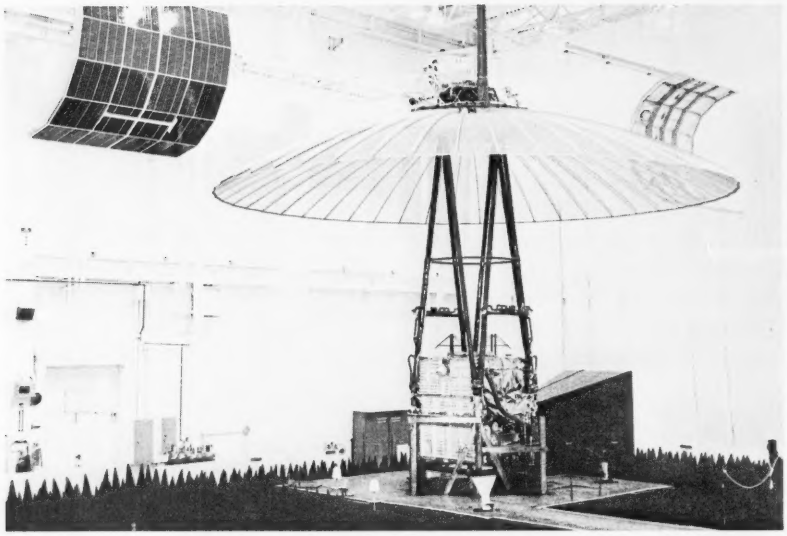
**W. C. Schneider**

At that time, members of the Skylab crews will receive commemorative plaques especially designed for the occasion. They are Charles Conrad, Jr., Joseph P. Kerwin and Paul J. Weitz, first mission; Alan L. Bean, Owen K. Garriott and Jack R. Lousma, second mission; and Gerald P. Carr, Edward G. Gibson and William R. Pogue, third mission.

The Selection Committee of NAA was chaired by Jack S. Parker, Vice Chairman of the Board of General Electric Co., and consisted of 24 distinguished aerospace leaders and authorities.

While recognizing the contributions to the Skylab Program of the more than 26,000 engineers, scientists, flight controllers and other technicians, the committee unanimously agreed that the Trophy should be presented Schneider as Program Director, on behalf of the Skylab crews, for his leadership of the exceedingly complex enterprise.

The Trophy was established in 1912 by Robert J. Collier, publisher and pioneer aviation enthusiast. The NAA, by which it is awarded, is the official representative of the Federation Aeronautique Internationale, an organization comprised of more than 65 member nations and responsible for the authentication of all official aviation and space records on a worldwide basis.



**ATS-F spacecraft in final systems test and checkout.**

## ATS-F LAUNCH, SET FOR MAY 30, PERHAPS MOST IMPORTANT OF '74

*Satellite Will Serve the World as a Broadcasting Station in Space*

What may turn out to be NASA's most important launch of 1974, a year of no new manned missions, will take place at Cape Canaveral on May 30 when the Applications Technology Satellite-F (ATS-F) is launched on a Titan III-C rocket.

The most complex, versatile and powerful communications spacecraft ever developed, the satellite, in a geosynchronous orbit some 35,680 kilometers (22,300 statute miles) above the equator, will match Earth's 24-hour rotational period and thus appear to remain over a fixed point on the globe. Operating from several selected stations over the next several years, it will serve an international community as an experimental broadcasting station in space.

ATS-F is the first communications satellite powerful enough to beam signals directly to small, inexpensive ground receiving stations. Present satellites require elaborate and expensive ground stations to receive and amplify earth communications relayed through the orbiting satellites.

To be named the ATS-6 in orbit, the satellite will be used to test a variety of new space communications concepts requiring the use of a geosynchronous-orbit spacecraft. These include broadcast of health and education television programs to receiving units in remote regions; aeronautical and maritime communications, position-location, and traffic-control techniques, as well as spacecraft tracking and data relay.

ATS-F will carry more than 20 technological and scientific experiments, many of them international in scope.

The 1,402-kilogram (3,090-pound) spacecraft consists essentially of an Earth Viewing Module (EVM) connected to a deployable reflector antenna that measures nine meters (30 feet) in diameter when deployed. Spacecraft control, communications, and experiment systems are located in the EVM. Electrical power is supplied by two semi-cylindrical solar panels on arms that extend over and beyond the antenna.

The spacecraft's most critical elements are the deployable antenna and the communications transponder. Through these two systems, ground controllers can relay high-quality communications signals on multiple frequencies at power levels reaching 500 watts to simple land, sea, and air receivers located over a large geographical area.

### First Year of Operation

For the first year of operation, ATS-F will be located at 94 degrees west longitude over the equator. At this location, a point over the Galapagos Islands, the spacecraft will be in communications view of all the continental U.S.

**GETTING READY FOR THE SHUTTLE—NASA officials, including Dr. Kurt H. Debus (fifth from right), Director of the Kennedy Space Center, members of the community, the press and contractor representatives attended recent ground-breaking ceremonies held there to mark the beginning of construction of the Space Shuttle Landing Facility at Kennedy Space Center. The 15,000-foot-long, 300-foot-wide runway is to be built on a northwest-southeast alignment to the northwest of the Vehicle Assembly Building.**

Shortly after the spacecraft is on this station and checked out, it will be used, along with the ATS-1 and ATS-3 now in orbit, to conduct the Health-Education Telecommunications (HET) experiment, which encompasses both educational TV and two-way medical teleconferencing demonstrations. The new capabilities pioneered in these experiments are expected to be fed into operational satellite systems established by the private sector in the future.

The HET experiments are planned in three geographic areas: the Rocky Mountain region, the Appalachian states, and the states of Washington and Alaska. HET will pioneer delivery of high-quality educational and health services to millions of Americans in remote parts of these areas, the mountainous nature of which makes TV reception from ground-based transmitters difficult.

The Federation of Rocky Mountain States (FORMS) is coordinating the installation of ground terminals for the HET experiment, not only in the Rocky Mountain states but also in Alaska and Appalachia.

This equipment, consisting of an ordinary TV set, a special converter, and a simple antenna, will either directly service a single community-type receiver or will be tied in with public broadcasting microwave or cable systems already operating in the cooperating states. Equipment for each of approximately 300 sites will cost less than $3,000.

For Appalachia, the main broadcast point to the spacecraft is the NASA ATS site at Rosman, NC. For the Rockies, the broadcast point is Denver, CO, and for Alaska it is Fairbanks.

## TESTING FACILITY FOR HEAO

Marshall Space Flight Center has awarded a contract to an architectural firm for the design of a facility to test and calibrate X-ray mirrors, telescope systems and other equipment.

The facility will be located at MSFC and will be used in the High Energy Astronomy Observatory program. Construction funds of $4.06 million have been proposed as a part of the NASA FY 1975 budget.

The design contract was awarded to H. J. Ross Associates, Inc., Miami, FL, in the amount of $272,393. Estimated completion date is August 16, 1974.

Construction of the facility is deemed necessary because of continued future emphasis on solar and astronomy studies in space which will require such a ground system. It will consist of three major components, including a 29-foot-long stainless steel chamber to house the telescopes or other systems, a chamber to house the X-ray source, and a 350-meter (1,000-foot)-long interconnecting X-ray path guide tube.

## LUCAS TO HEAD MSFC

Dr. William R. Lucas, who joined the rocket research and development team in Huntsville 22 years ago after serving in the Navy during World War II, will replace Dr. Rocco A. Petrone as Director of the Marshall Space Flight Center in June. He is now serving as Deputy Director.

Dr. Petrone has been named Associate Administrator of NASA, succeeding Dr. Homer E. Newell, retired. The appointment was effective March 15. Now serving temporarily in both capacities, he will be responsible for the overall management of the agency's research and development programs.

Dr. William R. Lucas

After leaving the Navy, Dr. Lucas, holding a Doctor of Philosophy degree in chemistry, with a minor in metallurgy, was assigned to the old Guided Missile Development Division staff with the Army at Redstone Arsenal. He quickly rose to be Chief of the Materials Branch and then, in 1956, transferred to the Army Ballistic Missile Agency.

In 1960, he was a member of the group that transferred from the Army to form the nucleus of the Marshall Center. He has made a particular study of environmental effects on materials.

The Huntsville Times recently wrote of him: "From top to bottom, friends, colleagues and employees of Huntsville's Dr. William R. Lucas regard him as something extra special—both professional and personally."

## NASA INFORMATION SYSTEM ONE OF WORLD'S LARGEST

*STI Office Makes Concerted Effort To Encourage Use of It*

When Congress set forth in the Space Act of 1958 a mandate that NASA should "provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof," it was laying the foundation for what has become a worldwide information-relaying system.

The volume of information assembled is massive. More than a million documents—600,000 domestic and 400,000 foreign—already have gone into the great accumulation of space knowledge since 1962. Seventy thousand are added each year. At least 100,000 of the foreign documents are in English or have been translated into English. They range in subject matter from astronomy to zoology and are readily available.

The computerized system developed to carry out the mandate was reviewed recently by Harold E. Pryor, Director of the NASA Scientific and Technical Information (STI) Office that administers the program. Although pleased by its accomplishments to date, he would like to see it do even better, and especially is he concerned over the possibility that NASA employees and the public do not understand exactly how to take advantage of the information assembled.

"Everybody uses information," he pointed out, "and a great many NASA and contractor people must have scientific and technical findings to do their daily work. We in the STI Office want to make sure that they are fully aware of the scientific and technical literature and the services that NASA makes available to participants in areospace programs."

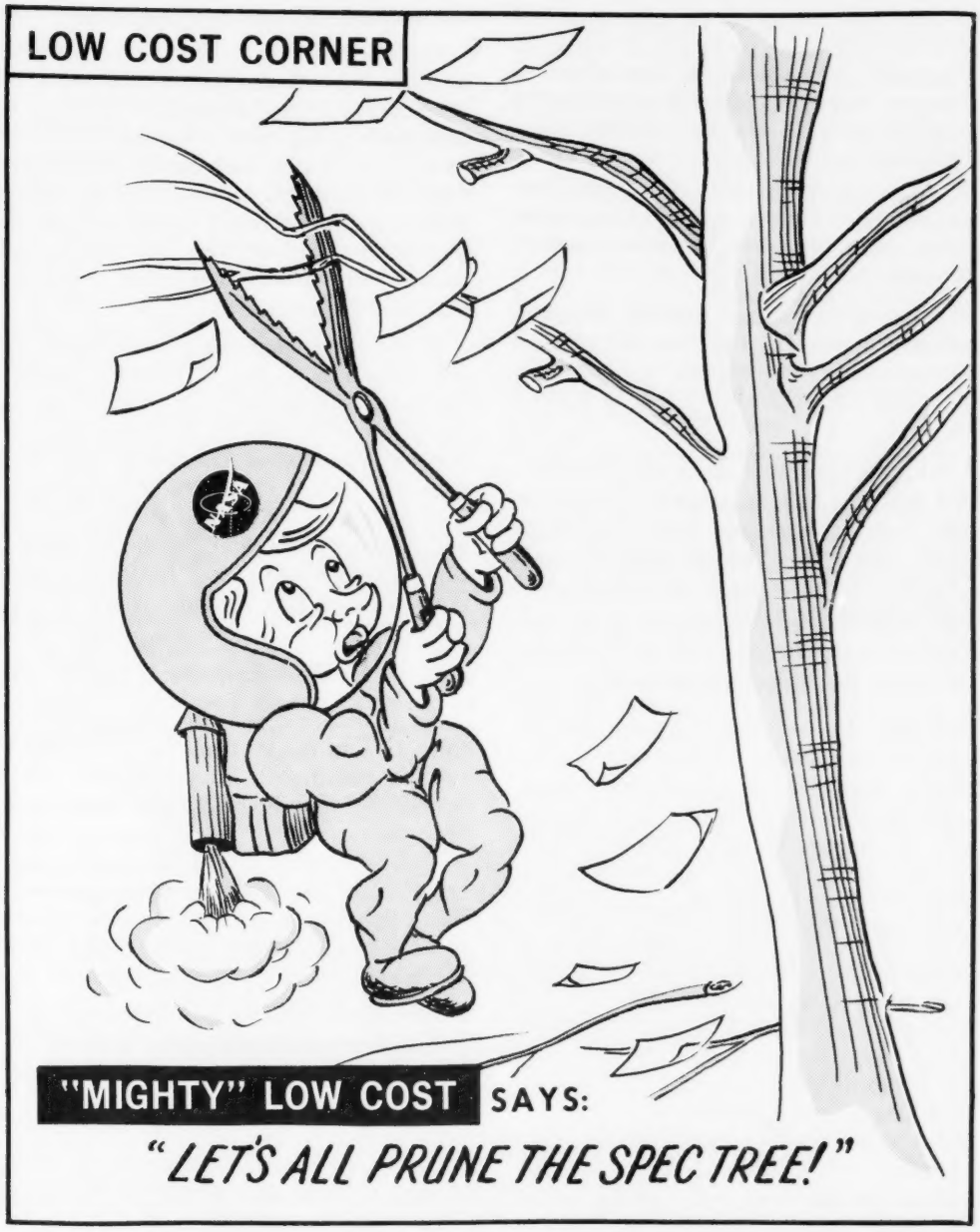
Because the system worked out to disseminate information involves such large numbers, a computerized approach was a necessity, he explained. Years went into its development, a combination of past experience gained from other Government agencies and of trial and error on the part of the new space agency. Less than an hour is required now to take care of the average request.

### Literature Searches Made

More than 8,000 machine searches are made annually for literature on subjects ranging from spaceborne and airborne computers to forming of stainless steel pipe fittings, from fuel resources to cost effectiveness of management information systems. References cited in these search results may be to as many as a thousand documents, with the average running to over 125.

When the energy crisis arose in recent months, a check of the central data base for references was made. It revealed more than 22,000 documents dealing with various aspects of the term "energy."

Two abstract journals published by NASA announce about 6,000 new documents each month. In the course of a year, the STI Office distributes approximately three and a half million copies of documents in full-size printed copy or in microphoto.




NASA has the option of procuring drawings to three specification levels of MIL-D-1000. Form 1 defines drawings made strictly to military standards. Forms 2 and 3 are drawings made to industry standards with either partial military controls or minimum military controls. What do you really need to do the job? Form 2 costs 40% more than Form 3 and Form 1 costs about 75% more than Form 3. Be sure you need what you specify.

FOR FURTHER INFO CALL LOW COST SYSTEMS OFFICE 202-755-8323

The STI Office has two contracts to provide for document input and processing. One is with Informations Systems Company for the operation of NASA's Scientific and Technical Information Facility, including the worldwide acquisition of technical report literature. The other is with the American Institute of Aeronautics and Astronautics and provides for obtaining worldwide literature on aerospace which appears in learned journals, books and monographs, as well as in presentations made at scientific and technical meetings and conferences.

At the head of the input process, however, Pryor assured, are the reports from NASA Centers and contractors. These come in automatically, at a rate of approximately 8,000 to 9,000 a year.

NASA sends its reports to many other Government R&D agencies and, in return, receives reports from those agencies and their contractors which are of interest to the space agency. As a result of these arrangements, the system acquires about 20,000 documents a year.

### Foreign Exchange Agreements

The STI Office has more than 200 formal exchange agreements abroad—directly with foreign governments, research organizations, educational institutions, and professional societies, bringing in annually 8,000 to 10,000 documents. From the AIAA contract each year come another 35,000 scientific journal articles, books, monographs, and scientific meeting papers.

Each piece of incoming material is carefully screened by analysts to determine that it comprises substantive scientific and technical information and is within the scope of NASA interests. As a consequence of this screening, 60,000 of the 70,000 new documents received each year are processed for announcement in the semi-monthly abstract journals, *Scientific and Technical Aerospace Reports* (STAR) *and International Aerospace Abstracts* (IAA), both broadly disseminated throughout the aerospace community. The remaining documents receive less processing, but references to them are machine retrievable.

The processing provides cataloguing and identification by report number, title, author, author affiliation, date, journal, and scientific meeting title. In addition, the abstract furnishes a concise description of each item, while the indexing assures concepts by which the information may be searched, browsed, and retrieved.

One effective channel by which system users are alerted to newly-acquired information is SCAN (Selected Current Aerospace Notices). Profiles have been prepared of more than 180 specific subject areas. Twice each month, computer-printed announcements of the information entering the NASA system, grouped by appropriate topic, are distributed to a mailing list of approximately 12,000 persons who have asked to participate in the SCAN program.

To keep users abreast of other kinds of technical information, the STI Office publishes two quarterly journals, *Computer Program Abstracts* and *Announcements of Software Resources*, and one annual journal, *Research and Technology Operating Plans*. The first two provide current information on NASA and other agency computer and software programs, while the third supplies concise information about NASA's research plans and efforts on a fiscal year basis.

### Bibliographies Provided

As a further means of making known the information in the system, the STI Office provides special, continuing bibliographies. At present, two are published monthly and cover aeronautical engineering and aerospace medicine and biology. A bibliography of NASA patent abstracts is published semi-annually, and a management bibliography is issued on an annual basis. They go automatically to NASA Centers, NASA contractors, and many other Government agencies.

Because of the energy crisis, two new continuing bibliographies now are in process. One deals with energy and the other with Earth resources.

In cooperation with the National Space Sciences Data Center at Goddard Space Flight Center, the STI Office is planning bibliographies covering the various satellite programs. The first of these will concern the OGO family.

In another service provided by the STI Office, NASA contractors and Government agencies may request and receive computerized literature searches ranging over the entire information base of a million documents.

Technical libraries of all NASA Centers are supplied with full-size hard copies and microphoto

formats (called microfiche) of the 34 different categories of completely processed, incoming information. The libraries employ a variety of announcement and display techniques to let users know of their receipt, just as they do for new books and periodicals. This also is true of libraries and information centers of NASA contractors and grantees.

"If NASA employees make use of the libraries to which they have access," advised Pryor, "they can nearly always find information in their area of interest. In addition to the informational tools cited, there are competent reference librarians and other staff members only too willing to help them satisfy their needs. If these needs cannot be met locally, librarians will go to external sources, or call upon the STI Office for assistance, particularly if other Government or foreign materials are involved.

"I would especially call the attention of NASA employees to RECON, the acronym for *RE*mote *CON*sole. This is a cathode ray tube-typewriter keyboard console that enables them, without typing skill, to engage in a dialogue with the central computer to seek out pertinent information from among the many documents on hand. RECON terminals are to be found in the libraries at NASA Headquarters and at most field Centers.

## RECORDS SET BY SKYLAB 4

*Most revolutions of the Earth*—1,213. Previous record: 858 set by Skylab 3.

*Most miles flown*—34,508,814. Previous record: 24.4 million set by Skylab 3.

*Longest time in space*—84 days, 1 hour, 15 minutes and 32 seconds. Previous record: 59 days, 11 hours, 9 minutes and 4 seconds set by Skylab 3.

*Individual time in space*—all three astronauts logged the Skylab 4 time. Previous record: 69 days, 15 hours, 53 minutes and 59 seconds logged by Alan Bean on Apollo 12 and Skylab 3.

*Longest EVA*—7 hours and 1 minute, by Gerald Carr and William Pogue.

*Most hours of EVA on one mission*—22 hours and 21 minutes on four space walks.

*Most data taken of Earth*—20,500 pictures and 19 miles of recording tape.

Controllers at Ames Research Center have altered the course of Pioneer 11 to make it skim within 42,000 kilometers (26,000 miles) of Jupiter on Dec. 5, then fly back across the solar system on an extended five-year trip to Saturn. The change is calculated to provide investigators with much better data on Jupiter than would have been possible from a repetition of the 1973 Pioneer 10 mission.

**PACEMAKER PATIENT—Jeni Guarascio, 3, is shown seated on the lap of her mother as she recently was introduced to members of the House Committee on Science and Astronautics by Dr. George M. Low, NASA Deputy Administrator, seated at the right of the table. In the center is Robert E. Fischell, a physicist at the Applied Physics Laboratory of Johns Hopkins University who helped develop the rechargeable pacemaker, which uses NASA-developed space technology and is designed to function in the human body for 20 years without surgical removal.**

## LABOR-MANAGEMENT RELATIONS SPREADS THROUGHOUT AGENCY

*12,000 NASA Employees—47 Per Cut—Now Represented by Eight Organizations*

The idea of providing employees with greater opportunities to share in making decisions, a procedure designed to bring about more effective conduct of public business, is now becoming firmly established in NASA, according to Edward J. Perron, Labor-Management Relations Specialist, Employee Relations Division, Office of Personnel, NASA Headquarters.

Provision for the procedure is embraced in Executive Order 11491, which governs the Federal Labor-Management Relations Program. It gives employees the right to join or not to join a union, and to participate in the formulation and implementation of personnel policies and practices affecting the conditions of their employment.

Under this order, labor organizations have made significant gains in membership, status, and impact on agency personnel policies and practices.

In NASA, more than 12,000 employees, or about 47 per cent of the work force, are represented by eight labor organizations, which have been granted exclusive recognition for 24 bargaining units.

Twelve of these rights of representation are held by the American Federation of Government Employees; three by the Pattern Makers League of North America; three by the National Federation of Federal Employees, two by the International Federation of Professional and Technical Engineers; and one each by the International Association of Machinists and Aerospace Workers, the International Association of Fire Fighters, the Metal Trades Council, and the Hotel and Restaurant Employees and Bartenders International Union.

National consultation rights have been accorded the Headquarters Office of the American Federation of Government Employees, giving it an opportunity to comment on proposed NASA-wide personnel policies and practices and proposed changes to existing NASA-wide personnel policies and practices.

Sixteen of these 24 bargaining units are covered by negotiated agreements between representatives of installation managements and labor organizations. Subject areas included cover a broad range of local personnel policies and practices, such as: leave scheduling, reassignments, grievance procedures, arbitration, equal distribution of overtime, parking, etc.

### MSFC Completes Negotiations

Within recent months, the Marshall Space Flight Center completed negotiations with Local 27 of the International Federation of Professional and Technical Engineers. Effective Feb. 5, 1974, the collective bargaining agreement covers non-supervisory professional engineers and scientists in NASA Class Codes 200 and 700. It is the first contract between the parties concerned, and the first in the space agency for engineers and scientists.

Lewis Research Center has completed a two-year agreement with Local 2182 of the American Federation of Government Employees. Becoming effective in March of this year and running through March, 1976, it is multi-unit, covers both wage-grade and Fire Fighters, and replaces two separate agreements.

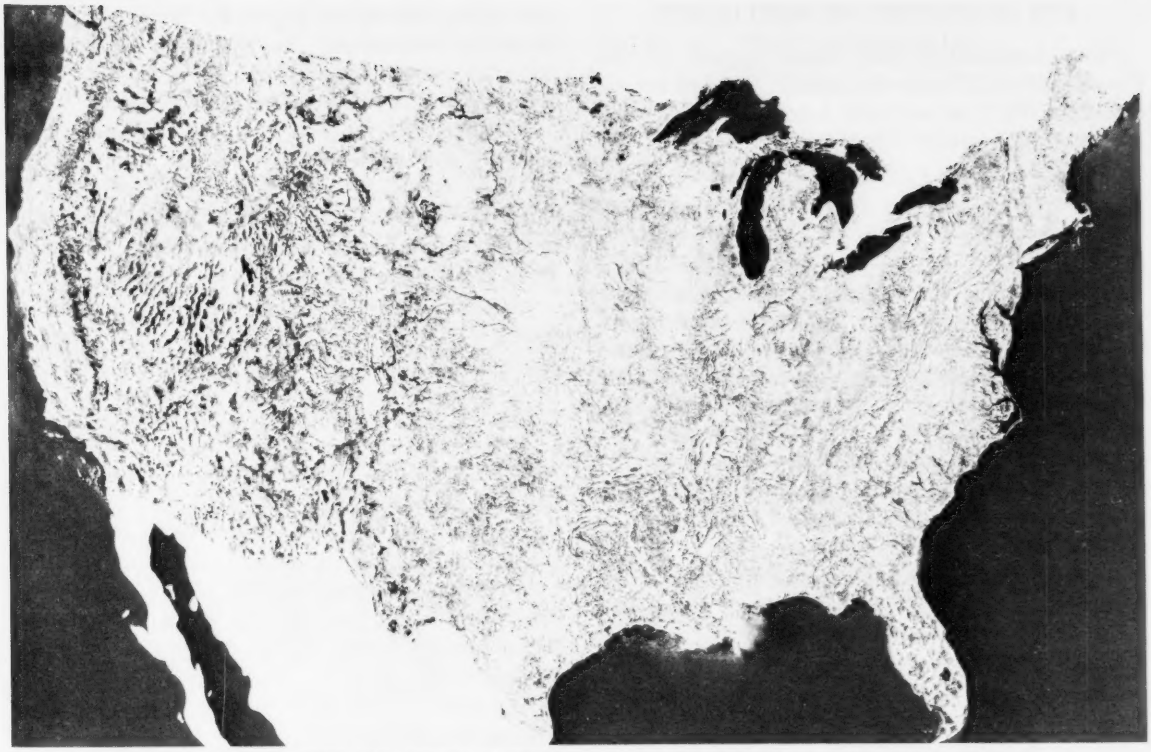
Multi-unit bargaining occurs when an agency and a labor organization, or a group of labor organizations, engage in joint negotiations covering any combination of units. This procedure appears to be successful because it avoids the confusion of dealing with a multiplicity of unions and bargaining units and lowers the cost of negotiation. The particular agreement involved had no procedural or regulatory violations, thereby expediting the review and approval process at NASA Headquarters.

Other negotiations being conducted, or soon to be conducted, involve the Kennedy Space Center, Langley Research Center, Marshall Space Flight Center, and the Johnson Space Center.

### Future of Program

External events which may have a bearing on NASA's future labor-management relations program center around the following:

The Federal Labor Relations Council has identified 11 broad areas comprising nearly two dozen specific questions as the central focus of its 1973-74 general review of the program. These concern: specific categories of people under the Order; supervisors; recognition procedures; consolidation of existing units; scope of negotiations; grievance and arbitration matters; approval of agreements; operation of third party procedures; impact of the expiration of an agreement on dues



**FIRST MAP OF THE U.S. FROM SATTELLITE—A 10-by-16-foot mosaic of the contiguous 48 states of the United States, the first ever assembled from satellite images, has been completed for NASA by the U.S. Department of Agriculture's Soil Conservation Cartographic Division and now is on display. It is composed of 585 cloud-free black-and-white images returned from the ERTS-1 satellite and all taken at an altitude of 912 kilometers (560 miles). Separate maps have been made of Alaska and Hawaii.**

withholding; status of negotiated agreements during reorganizations, and official time for negotiating.

Hearings will soon begin in Congress on a proposed Federal Service Labor-Management Act introduced by Rep. David N. Henderson (D-NC). Its main features provide for the establishment of a three-person Federal Labor Relations Authority to administer the program; certification of a labor organization without an election when it represents a majority of employees; the establishment of a Federal Labor Relations Board to meet and confer with labor organizations on policies and regulations to be issued by the U.S. Civil Service Commission, or any other agency, relating to employees of more than one agency; official time for agency employees representing labor organizations during negotiations; and dues withholding without cost to a labor organization when an employees voluntarily requests dues withholding.

"Perhaps the most notable impact of the Federal Labor-Management Relations Program," Perron said in summary, "concerns its impact on management's decision-making processes. Managers and supervisors must consider the obligations and responsibilities imposed on them by the Executive Order, NASA instructions, negotiated agreements, and particularly the requirement that the labor organization must be consulted prior to decisions concerning new or revised personnel policies and practices, or other matters affecting the working conditions of their employees.

"Significant trends which we can expect for the future include an increase of engineers, scientists, and other professional employees in bargaining units; more third-party arbitrations in disputes over the resolution of employee grievances; more appeals to the Federal courts of agency personnel decisions; and some limitations upon the authority of an agency head to disapprove locally negotiated agreements."

## 1973 SPACE REPORT PUBLISHED

"The Aeronautics and Space Report of the President," a 137-page document covering activities in 1973, has recently been published. The text of the President's message transmitting the report to Congress follows:

"I am pleased to transmit this report on our nation's progress in aeronautics and space activities during 1973.

"This year has been particularly significant in that many past efforts to apply the benefits of space technology and information to the solutions of problems on Earth are now coming to fruition. Experimental data from the manned Skylab station and the unmanned Earth Resources Technology Satellite are already being used operationally for resource discovery and management, environmental information, land use planning, and other applications.

"Communications satellites have become one of the principal methods of international communication and are an important factor in meeting national defense needs. They will also add another dimension to our domestic telecommunications systems when the first of four authorized domestic satellite systems is launched in 1974. Similarly, weather satellites are now our chief source of synoptic global and local weather data. Efforts are continuing to develop capabilities for worldwide two-week weather forecasts by the beginning of the next decade. The use of satellites for efficient and safe routing of civilian and military shops and airplanes is being studied. Demonstration programs are now underway aimed at improving our health and education delivery systems using space-age techniques.

"Skylab has given us new information on the energy characteristics of our Sun. This knowledge should help our understanding of thermo-nuclear processes and contribute to the future development of new energy sources. Knowledge of these processes may also help us understand the Sun's effect on our planet.

"Skylab has proven that man can effectively work and live in space for extended periods of time. Experiments in space manufacturing may also lead to new and improved materials for use on Earth.

"Development of the reusable Space Shuttle progressed during 1973. The Shuttle will reduce the costs of space activity by providing an efficient, economical means of launching, servicing and retrieving space payloads. Recognizing the Shuttle's importance, the European Space Conference has agreed to construct a space laboratory—Spacelab—for use with the Shuttle.

"Notable progress has also been made with the Soviet Union in preparing the Apollo-Soyuz Test Project scheduled for 1975. We are continuing to cooperate with other nations in space activities and sharing of scientific information. These efforts contribute to global peace and prosperity.

"While we stress the use of current technology to solve current problems, we are employing unmanned spacecraft to stimulate further advances in technology and to obtain knowledge that can aid us in solving future problems. Pioneer 10 gave us our first closeup glimpse of Jupiter and transmitted data which will enhance our knowledge of Jupiter, the solar system, and ultimately our own planet. The spacecraft took almost two years to make the trip. It has traveled over 94,000 miles per hour—faster than any other man-made object—and will become the first man-made object to leave our solar system and enter the distant reaches of space.

"Advances in military aircraft technology contribute to our ability to defend our nation. In civil aeronautics, the principal research efforts have been aimed at reducing congestion and producing quieter, safer, more economical and efficient aircraft which will conserve energy and have a minimum impact on our environment.

"It is with considerable satisfaction that I submit this report of our ongoing efforts in space and aeronautics, efforts which help not only our own country but other nations and peoples as well. We are now beginning to harvest the benefits of our past hard work and investments, and we can anticipate new operational services based on aerospace technology to be made available for the public good in the years ahead on a routine basis."

*(Editor's Note: The Report is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; price, $1.70 per copy.)*

## HEAO DESIGN APPROVED

Science experimenters and contractors are proceeding with the design and fabrication of experiment hardware for the first flight of the High Energy Astronomy Observatory (HEAO).

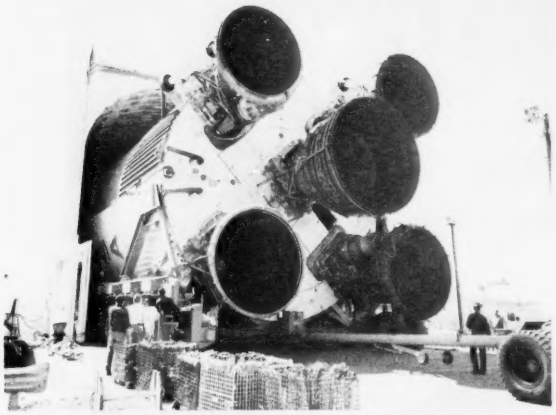
The first flight calls for an X-ray survey of the sky from a satellite in low circular Earth orbit.

By means of this survey, scientists hope to obtain information about some of the newest and most mysterious phenomena of the universe—pulsars, black holes, neutron stars and supernovas.

The program is managed for the Office of Space Science by the Marshall Space Flight Center. Initially approved in 1972 as a series of large unmanned observatories, it has been restructured into a series of smaller scale missions, the later ones planned as payloads aboard the Space Shuttle.

A total of three flights are now projected in the initial series, to be launched by Atlas Centaur vehicles. It is for the first of these flights, called HEAO-A, that experiment contracts have been completed at a total value of $23,349,266.

The HEAO-A observatory will weigh about 3,175 kilograms (7,000 pounds) and will carry four major experiments.



**FOR THE PUBLIC TO SEE—The S-IC-T test stage for the Saturn V, has been transferred by barge from the Marshall Space Flight Center to the Kennedy Space Center, where it will be on display near the Vehicle Assembly Building. The stage was static fired 22 times at MSFC and at the Mississippi Test Facility from 1965 through 1967.**

## SHUTTLE ENGINE TEST

The first hot firing of the Space Shuttle main engine test program took place April 14 with the successful run of a preburner assembly at the Santa Susana, CA, test site of the Rocketdyne Division of Rockwell International Corp.

The 3.5-second burst, conducted on a modified Apollo test stand, was run at 12:46 a.m. PDT. It is to be followed by more component and subsystem testing at Santa Susana.

Test firing of the main engines will be accomplished at the Mississippi Test Facility.

## 125 SKYLAB HONOR AWARDS GIVEN IN FOUR CEREMONIES

*Dale Myers Is Presented His Second Distinguished Service Medal*

In four special Skylab Honor Award ceremonies during two successive days, NASA last month presented 125 awards to employees and contractor personnel who made outstanding contributions to what has become recognized as one of the space agency's most successful programs.

The first ceremony was held at Headquarters on April 18 and followed that afternoon by the second at Johnson Space Center. Next morning the presentations, made by Dr. James C. Fletcher, NASA Administrator, and Dr. George M. Low, Deputy Administrator, were continued at Marshall Space Flight Center and were concluded during the afternoon at Kennedy Space Center.

At the conclusion of the ceremony at Headquarters, NASA's highest award, the Distinguished Service Medal, was presented to Dale D. Myers, who recently resigned as Associate Administrator for Manned Space Flight. It was the second he had received and, as Dr. Fletcher said, was "for his total service to NASA in the four years he has headed all of our manned space flight programs."

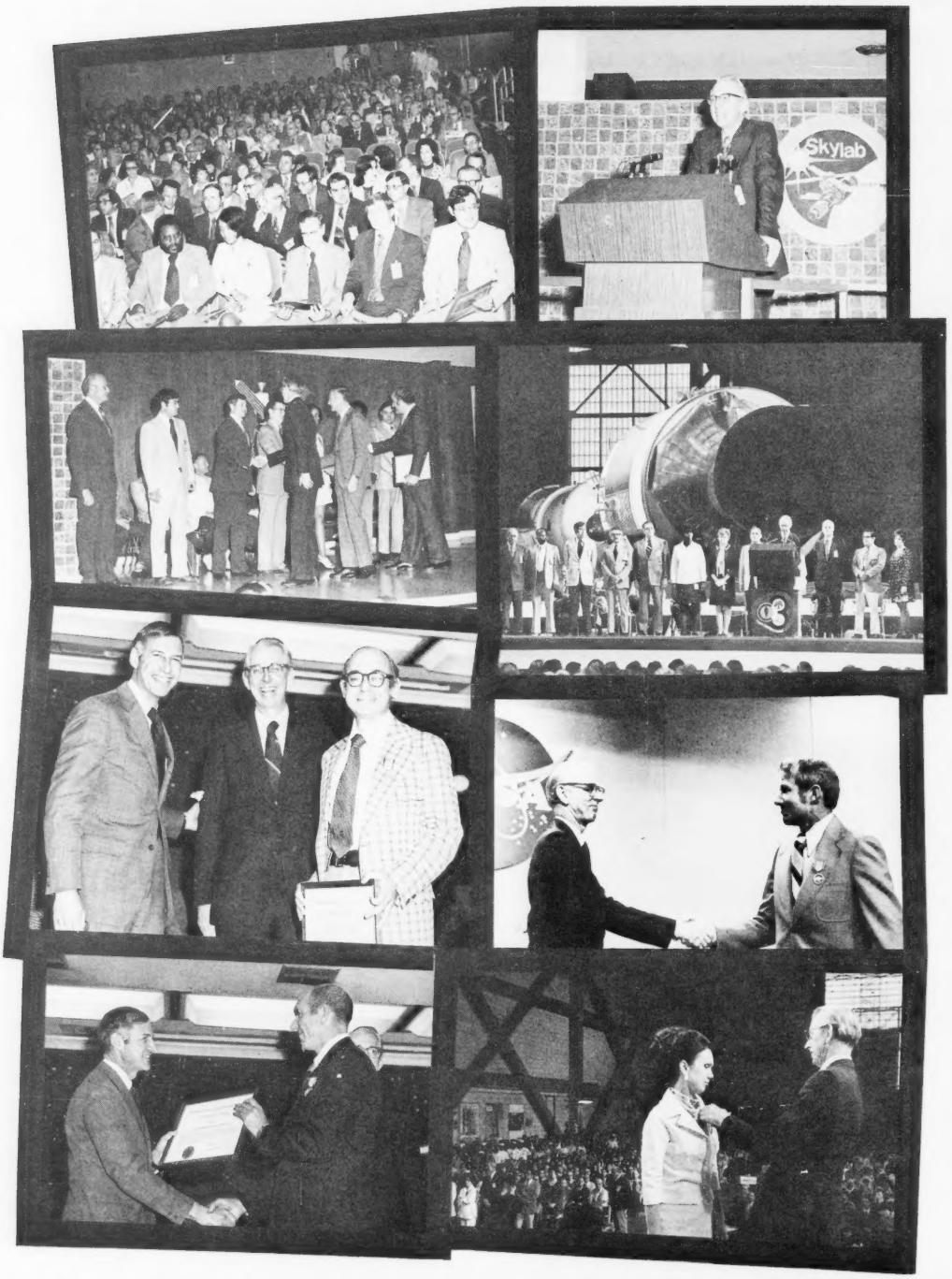
In ceremonies held at Johnson Space Center in March, the Distinguished Service Medal was presented to the members of the Skylab 4 team by President Nixon. They are Gerald P. Carr, Edward G. Gibson and William R. Pogue.

Just before starting the presentations at Headquarters, Dr. Fletcher announced that still another Skylab award ceremony would be held in the future.

"In a few months," he said, "we plan to honor some of the most outstanding of the scientists and experimenters through whose efforts—in the planning and design of experiments and in the analysis and interpretation of results—the ultimate benefits of the Skylab mission are being achieved."

In commenting on the accomplishments of the Skylab Program, he said it "gave us an orderly transition from the Apollo era of lunar exploration to the Shuttle/Skylab era of the 1980s and 1990s, when we will stress the scientific and practical uses of manned and automated spacecraft in Earth orbit."

He added that Skylab continued the U.S. leadership in manned space flight "we worked so hard




AWARD CEREMONY SCENES—Top row, left, audience at MSFC, right, Administrator James C. Fletcher speaking at MSFC; second row, left, Special Group Achievement Award is presented personnel at MSFC, right, same award to personnel of KSC; third row, left, left to right, Deputy Administrator George M. Low, Dr. Fletcher and Maurice Dubin of Headquarters, right, Dr. Fletcher and Vance D. Brand of JSC; fourth row, left, Dr. Low presents certificate to William H. Hamby at Headquarters, right, Dr. Fletcher presents Exceptional Service Medal to Annie E. Taylor at KSC.

to attain in Mercury, Gemini, and Apollo." He credited the program with demonstrating the value of Earth observations from space, with reinforcing the nation's ability to encourage international cooperation in space, and with confirming the rightness of the decision to develop the Space Shuttle and Spacelab in this decade.

"As I see it," he continued, "Skylab has been one of our most productive satellites. It has been man's first home in space. It has opened a new part of the Universe—beyond Earth, but near Earth—for occupation and use by human beings. It has shown the world what we meant when we said Apollo was not the end, but the beginning."

Awards were presented as follows:

**Headquarters**

*Exceptional Service Medal*—Maurice Dubin, Gerard R. David, William D. Green, William H. Hamby, Henry Iuliano, Joseph Martin, James E. Powers, Jr., Paul J. Pashby, Alfred L. Ryan, Paul D. Schrock and Earl A. Smith.

*Group Achievement Award*—Special committee representative of all employees at the Headquarters Office of Manned Space Flight selected to receive it with William Schneider, Skylab Program Director.

*Distinguished Service Medal*—Dale D. Myers.

**Johnson Space Center**

*Distinguished Service Medal*—Robert F. Thompson.

*Outstanding Leadership Medal*—M. P. Frank, III.

*Exceptional Service Medal*—Vance D. Brand, William H. Bush, Jr., Lawrence F. Dietlein, Jackson D. Harris, Jay F. Honeycutt, Jerry R. Hordinsky, William J. Huffstetler, Jr., Gary W. Johnson, William B. Lenoir, Don L. Lind, Allen J. Louviere, Bruce McCandless, II, John E. McLeaish, Harold J. McMann, Jr., Bobby J. Miller, F. Story Musgrave, Richard P. Parten, Melvin L. Richmond, Samuel D. Sanborn, Carl B. Shelley, Malcolm C. Smith, Jr., John C. Stonesifer, Elmer L. Taylor and Charles K. Williams.

*Public Service Award*—James C. Edwards, Air-Lock, Inc.; George B. Merrick, Space Division, Rockwell International; Robert J. Molloy, Denver Division, Martin Marietta Aerospace; George R. Mulcahy, SERV-AIR, Inc.; Richard C. Nelson, AiResearch Manufacturing Co.; and Homer D. Reihm, ILC Industries, Inc.

*Group Achievement Award*—Earth Resources Experiment Team; Skylab Medical Team; U.S. Navy Recovery Task Groups; and a special committee representatives of all employees of the Johnson Space Center selected to receive it with Dr. Christopher C. Kraft, Center Director.

**Marshall Space Flight Center**

*Exceptional Service Medal*—Billy M. Adair, Leslie F. Adams, William E. Davidson, Carmine E. DeSanctis, Porter Dunlap, Robert C. Edwards, Elmer L. Field, Henry B. Floyd, III, Daniel M. Germany, Herman L. Gilmore, Charles B. Graff, Gerald W. Hawkins, Belton Jones, Jr., John R. Lanier, Jr.

Roy C. Lester, Robert Lindstrom, Jerrol W. Littles, Ann R. McNair, Paul G. Parks, Wayne H. Patterson, James N. Strickland, Jack C. Swearingen, Jerold L. Vaniman, Richard D. Wegrich, Charles L. Wood, Jack T. Wood and Alvan P. Woosley.

*Group Achievement Award*—Attitude Control Anomaly Team; Coolant Loop Repair Team; Rate Gyro Anomaly Team; S-IB Stage Fin Structural Failure Team; and a special committee representative of all employees of the Marshall Space Flight Center selected to receive it with Dr. Rocco A. Petrone, Center Director.

*Distinguished Public Service Medal*—Ben G. Bromberg, McDonnell Douglas Astonautics Co., and William G. Purdy, Martin Marietta Corp.

*Public Service Award*—William J. Brennan, Rockwell International Corp.; Caleb B. Hurtt, Martin Marietta, Corp.; Ervin T. Kisselburg, McDonnell Douglas Astronautics Co.; Stephen Ramminger, International Business Machines Corp.; Fred J. Sanders, McDonnell Douglas Astronautics Co.; and Vanio J. Vehko, Chrysler Corp.

*Public Service Group Achievement Award*—Ball Brothers Research Corp.

**Kennedy Space Center**

*Group Achievement Award*—Saturn LB Fin Replacement Team, The Boeing Co., Chrysler Corp., KSC Installation Support and KSC Launch Operations.

*Public Service Award*—Hans P. Bruckner, Bendix Corp., Launch Support Div., KSC; William C. Holmes, Boeing Aerospace Co.; L. H. Yount, Chrysler Corp., Space Div., Florida Operations; Chester E. Pickett, Federal Electric Corp., KSC; Vincent Fiorenza, The General Electric Co., Apollo and Ground Systems; George M. Smith, International Business Machines Corp.; Kenneth P. Timmons, Martin Marietta Corp., Skylab Program; Harold Eaton, Jr., McDonnell Douglas Astronautics Co., Florida Test Center; and T. J. O'Malley, Rockwell International, Space Division, KSC Field Operations.

*Exceptional Service Medal*—John H. Dickinson, Richard P. Dodd, John C. Leeds, Jr., George D. Matthews, Joe R. Medlock, Walter D. Moody, Arthur H. Moore, Clyde B. Netherton, Walter E. Parsons, A. Robert Rafaelli, James E. Rice, Glover H. Robinson, William H. Rock, Jackie E. Smith, James A. Smith, Jr., Annie E. Taylor, Col. Alan R. Vette, USAF, James R. White and Albert Zeiler.

*Distinguished Service Medal*—Donald D. Buchanan.

*Skylab Group Achievement Award*—Special committee representative of all employees of the Kennedy Space Center selected to receive it with Dr. Kurt H. Debus, Center Director.

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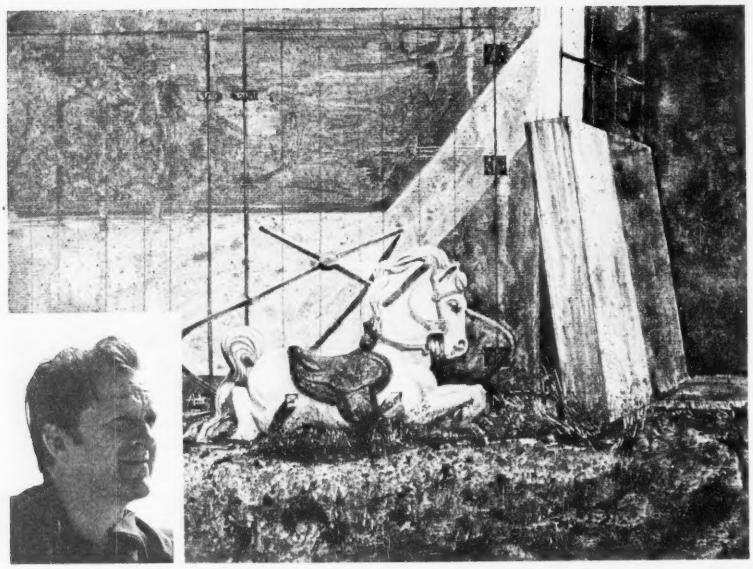
The Saturn 1B first stage for the Apollo-Soyuz Test Project launch in July, 1975, has been transferred from the Michoud Assembly Facility to Kennedy Space Center, where it will be stored until December, when the Saturn IB will be assembled on its mobile launcher.



James Dean and his painting, "Rocking Horse"

## NASA ARTIST RECOGNIZED

James Dean, Deputy Director of Plan and Media Development and Director of NASA's Art Program, has been notified that his painting, "Rocking Horse," was selected by the Jury of Awards of the American Watercolor Society for inclusion in its 107th Annual Traveling Exhibition.

During April, the painting was displayed in the Society's Annual Exhibition in New York City.

The itinerary of the Traveling Exhibition follows:

Arnot Art Museum, Elmira, NY, May 15-June 5.

Telfair Academy of Arts and Sciences, Savannah, GA, June 19-10.

Hunter Museum of Art, Chattanooga, TN, July 24-August 14.

Clinton Art Association, Clinton, IA, August 28-Sept. 17.

Panhandle Plains Historical Museum, Canyon, TX, Oct. 2-23.

Florida Gulf Coast Center, Belleair, FL, Nov. 3-24.

Columbia Museum of Art, Columbia, SC, Dec. 6-27.

Charles B. Goddard Art Center, Ardmore, OK, Jan. 8-29, 1975.

Southwest Texas State University, San Marcos, TX, Feb. 12-March 5, 1975.

West Liberty State College, West Liberty, WV, March 19-April 9, 1975.

The Saginaw Art Museum, Saginaw, MI, April 23-May 14, 1975.

## MONACO HONORS NASA

NASA has been presented a gold plaque on behalf of Prince Rainier, III, of the Principality of Monaco for its contribution to worldwide television.

The presentation specifically mentioned the live telecasts from the Moon as American astronauts conducted their lunar explorations during the Apollo Program.

The award was accepted for the agency by Dr. James C. Fletcher, NASA Administrator, from Eugene P. Kopp, Deputy Director of the U.S. Information Agency, representing the Prince, who sent word NASA deserved special recognition for "one of the most dramatic tevelision events of the past quarter century."

## SKYLAB IN STABILIZED ORBIT

Marshall Space Flight Center reports that the Skylab cluster, vacant now after three long periods of occupancy in Earth orbit, is remaining stable with its Multiple Docking Adapter pointing away from Earth.

This was learned after a check by the U.S. Air Force North American Defense Command. It showed that the space station is not tumbling.

PHILATELIC SPACE SOUVENIRS—Barbara Douglas of the Postal Service Philatelic Sales Unit, a recent guest speaker at a Goddard Stamp Club meeting, presents the Club with a poster showing Space Age stamps, including the eight-cent air mail stamp (upper left) honoring space pioneer Dr. Robert H. Goddard. Accepting is Club President Richard Marriott (center) and Robert Krider, fellow philatelist. The Club has 65 members.

## MTS EXPERIMENT LAUNCHED IN '72 RATED SUCCESSFUL

*Primary Experiment Extended Second Year to Provide Additional Data*

The first year of flight test data from the NASA Explorer 46 Meteroid Technology Satellite (MTS) has proved a double wall meteoroid protection concept to be six times as effective as a standard single wall construction in protecting against meteoroid penetration. Thus, future spacecraft will not be required to carry as much weight for meteroid protection.

Explorer 46's primary experiment measured the meteoroid penetration rates in a "bumper-protected" target to evaluate the effectiveness of this concept under actual space conditions. The data will be used in the design of meteoroid protection for future spacecraft. The primary experiment also better defined the meteoroid environment of near-earth space.

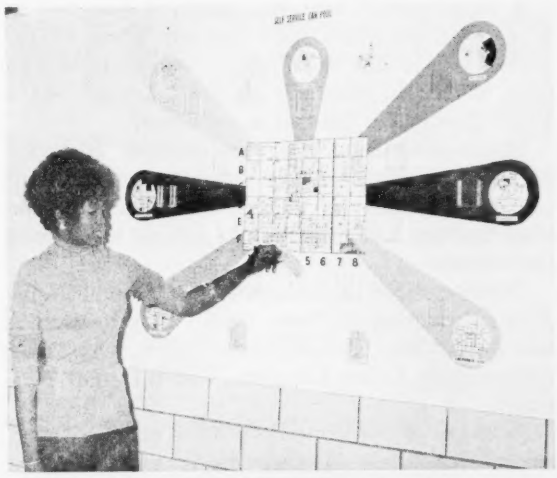
Operation of the primary experiment has been extended for a second year to provide additional data on the bumper experiment. It will also make possible study of an apparent directionality in the meteoroid environment which had not been expected.

Despite a panel deployment anomaly, the Explorer 46 Meteoroid Technology Satellite mission has been termed successful, based on the year of data obtained from the primary experiment. Built by the Langley Research Center, the satellite was launched from Wallops Island on August 13, 1972.

Following launch, half of the panels in the bumper experiment were only partially deployed. This had a serious effect on the spacecraft attitude and resulted in overheating and eventual shutdown of spacecraft batteries nine days after it was placed in orbit. From then on, data from the primary "bumper" experiment were received successfully through a backup telemetry system which operates on solar cells and transmits continuously when in sunlight.

Since the Explorer 46 secondary experiments were powered only by the spacecraft batteries, no data was received from these experiments on meteoroid impact flux and velocity after the first nine days. At that time, approximately 1,850 impacts on the meteoroid impact flux detectors had been recorded.

These results were sufficient to show conclusively that microphone-type meteoroid impact sensors (flown on early Explorer and Discoverer satellites) had greatly overestimated the population of small meteoroids. No data were obtained from the other secondary experiment designed to measure the velocities at which meteoroids impact spacecraft.



SIMPLIFIED CAR POOL SERVICE—Flight Research Center has established a new self-service car pool featuring maps of communities and cards seeking riders or asking for rides. Karen Martin is shown putting in her request.

## FLETCHER TALK PUBLISHED

A major portion of the talk Dr. James C. Fletcher, NASA Administrator, recently gave before the National Space Club in Washington has been published in pamphlet form in the March issue of AEROSPACE PERSPECTIVES, the monthly publication of the Aerospace Industries Association, 1725 De Sales Street, N.W., Washington, DC.

Entitled "The Limitless Horizons of Space," the talk gives a wide-ranging view of expected directions, scope and progress in national and international space programs through the next 18 years.

## TORNADOES DAMAGE MSFC

Tornadoes that struck in Alabama during April did an estimated $750,000 in damage to buildings and property at the Marshall Space Flight Center.

The damage was primarily to roofs and windows. Early the following morning, emergency repair crews were on duty cleaning up debris, making repairs to buildings and restoring electrical service. Power was restored to all buildings by noon.

Despite the threat to the Center, MSFC was able to provide a 45-kilowatt generator to the nearby town of Triana, which was temporarily without water after the failure of its electrical system.

## MSFC SUPERVISORY TRAINING

A supplemental training program designed to acquaint supervisors with problem areas of supervision peculiar to a given organization has been conducted regularly at the Marshall Space Flight Center for the last three years.

The supplemental program involves 20 hours of training. This is in addition to the training courses provided by NASA Headquarters, the Civil Service Commission, and private and public institutions.

Topics covered in the supplemental program include: Reduction in Force, OSHA Safety, Alcohol and Drug Abuse, Career Development, Grievances and Appeals, Labor Relations, and the EEO Program.

Members of the Manpower Office at MSFC who are professionals in their fields and who are familiar with the functions and problems unique to MSFC teach the courses. Approximately 1,000 supervisors have taken this portion of the MSFC Supervisory Training Program.

## DR. TUTTLE HONORED

Dr. Frederick B. Tuttle, Director of the Educational Programs Division of NASA, was presented the Frank G. Brewer award at a banquet session of the National Congress on Aerospace Education in Las Vegas, NV, in early April.

The award is presented annually for outstanding contributions to aerospace education of the nation's youth. It is administered by the National Aeronautic Association.

## LUNAR SAMPLE EXHIBITS

The following is a schedule of lunar sample exhibits from May 15 to June 15:

MICHIGAN—Mid-Michigan Community College Display, Campus, Harrison, May 19-22; Ann Arbor Scout-A-Rama, 5270 Geddes Road, Ann Arbor, May 18; Detroit Area Boy Scout-O-Rama, Detroit, June 7-9.

NEW JERSEY—Bridgeton Antiquarian League, Nail House Museum, Bridgeton, May 23-27.

PENNSYLVANIA—Transpo-Erie, Delta Nus Alpha, Erie, May 17-18; Scottsdale Centennial, Scottsdale, June 7-16.

SOUTH DAKOTA—Science Week, Yankton High School, 2000 North Mulberry Street, Yankton, May 13-18.

TEXAS—Beeville Naval Air Show, Beeville, May 17-27.

WISCONSIN—St. Johns Carnival, Janesville, June 1-2.

### Permanent Displays

ALABAMA—Alabama Space & Rocket Museum, Marshall Space Flight Center, Huntsville.

FLORIDA—Visitor Information Center, Kennedy Space Center.

KANSAS—Eisenhower Library, 200 S. E. 4th Street, Abilene.

NEW YORK—United Nations Building, New York.

OHIO—U.S.A.F. Museum, Wright Patterson Air Force Base.

TEXAS—Johnson Library, University of Texas, Austin; Visitor Information Center, Johnson Space Center, Houston.

VIRGINIA—Visitor Information Center, Langley Research Center, Hampton.

WASHINGTON, DC—National Geographic Museum; Smithsonian Institution, National Air and Space Museum, 1000 Jefferson Drive.

## HEADQUARTERS PRESS RELEASES

*(Issued by the Public Information Division, Code FP, Headquarters, Washington, DC 20456. These releases are available only to members of the news media.)*

74-79 Design for First HEAO Flight Experiment Approved

74-80 Three Firms Selected for EOS

74-81 NTE/ERRATA Sheet to Westar Press Kit

74-82 Jupiter Science Briefing Will Be April 9

74-83 McDonnell Douglas Selected for Space Shuttle Support

74-84 McDonnell Douglas Awarded Delta Space Vehicle
74-85 NASA/Soviet Biology Group Finishes Session
74-86 NASA Participates in Rail Car Study
74-87 NASA, Commerce Dept. to Sign Tech Transfer Pact
74-88 Delta 100 Failure Review Completed
74-89 Soviet Space Personnel to Spend Month at JSC
74-90 NASA Awards Honors to Personnel
74-91 First Photo Map of U.S. Made by Satellite
74-92 NASA Seeks Life Sciences Personnel
74-93 Skylab Orbit
74-94 Pioneer 11 to Be Aimed for Saturn 4/19
74-95 SMS-A Press Kit
74-96 NASA Seeking Patent for Special Solar Panel Cooling
74-97 Rockwell Awarded NASA Shuttle Contract
74-98 NASA Tests Meteoroid Protection Techniques
74-99 ATS-F Launch Date Changed
74-100 Use of Satellite in Flood Monitoring
74-101 Dayle Named to International Affairs Post
74-102 NASA Assigns Consultant to Baltimore Urban Problems
74-103 Wallops Designated a Flight Center
74-104 IBM Corp. Receives Shuttle Launch Processing Contract System
74-105 Planning Research Corp. Gets Kennedy Center Contract
74-106 NASA Appoints Minority Press Aide

## FILM ACTIVITY

Two NASA films, "Mars—The Search Begins" and "Our Solar System," were selected to receive CINE Golden Eagle Certificates in competition at the Council on International Nontheatrical Events (CINE) 1974.

The film, "Our Solar System," has also been honored with a "Silver Screen Award" at the 1974 U.S. Industrial Film Festival.

The Film, "New View of Space," was awarded a "Diploma of Recognition" at the 8th International Festival of Scientific and Technical Films, Belgrade, Yugoslavia.

## RADIO-TELEVISION (Released Nationally)

### May

*TELEVISION*—A color film release, *Aeronautics and Space Report*, "Space Sensors Used in Cerebral Palsy Studies."

*RADIO*—Four weekly *Space Story* programs have been released: "ATS-F," (Fairchild/Von Braun); "U-2 Resource Mission," (ARC/Knutson); "New ATS Satellite," (Hqs/Hamilton). One monthly *NASA Special Report*, "Project Viking: Search for Life Elsewhere," featuring (ARC/Dr. Klein). One set of ten 60-second quarterly *NASA Space Notes*.

## PATENTS AND INVENTIONS RESULTING FROM NASA RESEARCH

*(The Office of General Counsel, NASA Headquarters, announces that the following U.S. patents have been issued by the U.S. Patent Office to NASA for inventions resulting from NASA research. Inquiries concerning them should be directed to the attention of the NASA Patent Counsel for the indicated installation.)*

| *Inventor(s) and Employer* | *Title of Invention* | *Patent No.* | *Installation* |
|---|---|---|---|
| George T. Clawson, NASA/GSFC | Method and Apparatus for Checking Fire Detectors | 3,802,249 | GSFC |
| Bruce A. Banks, NASA/LeRC | Electromagnetic Flow Rate Meter | 3,802,262 | LeRC |
| Gary Y. Wang, NASA/LaRC | A Synchronous Binary Array Divider | 3,803,393 | ERC/LaRC |
| Frederick T. Schuller and Warren A. Moore, NASA/LeRC | Journal Bearings | 3,804,472 | LeRC |
| Robert E. Munson, Ball Brothers Research Corp., Boulder, CO | Turnstile Slot Antenna | 3,805,266 | GSFC |
| George Kobologg and Fred Dietrich, Philco-Ford, Palo Alto, CA; Robert J. Martel, Westinghouse Corp., Pittsburgh, PA, and C. Curtis Johnson, NASA/GSFC | Amplitude Steered Array | 3,806,932 | GSFC |
| Louis O. Caudill, NASA/GSFC | Method and Apparatus for Optically Monitoring the Angular Position of a Rotating Mirror | 3,802,799 | GSFC |
| Lance G. Hays, Caltech/JPL, Pasadena, CA | Flow Control Valve | 3,802,660 | NaPO |
| Norman Bilow and Richard I. Akawie, Hughes Aircraft Co., Los Angeles, CA | Thiophenyl Ether Disiloxanes and Trisiloxanes Useful as Lubricant Fluids | 3,801,617 | MSFC |
| Kenneth L. Hallam and Charles Bruce Johnson, Bendix Research Laboratories Bendix Center, Southfield, MI | Image Tube | 3,806,756 | GSFC |
| James S. Ajioka, George I. Tsuda and William A. Leeper, Hughes Aircraft Co., Los Angeles, CA | High Efficiency Multifrequency Feed | 3,803,617 | Hdqrs./GSFC |

## PATENTS AND INVENTIONS RESULTING FROM NASA RESEARCH—Cont.

| | | | |
|---|---|---|---|
| William H. Kinard, NASA/LaRC | Deployable Pressurized Cell Structure for a Micrometeroid Detector | 3,805,822 | LaRC |
| Leonard L .Kleinberg, NASA/GSFC | Ultra-Stable Oscillator | | |
| John C. Evans, Jr., and Henry W. Brandhorst, Jr., NASA/LeRC | Rapidly Pulsed, High Intensity, Incoherent Light Source | 3,806,835 | LeRC |
| Herbert S. Kobayashi, NASA/JSC | Pulse Code Modulated Signal Synchronizer | 3,806,816 | JSC |
| Marvin K. Simon, Caltech/JPL, Pasadena, CA | Decision Feedback Loop for Tracking a Polyphase Modulated Carrier | 3,806,815 | NaPO |
| John F. Hamlet, NASA/MSFC | Automated Quadrature Control and Measuring System | 3,806,802 | MSFC |
| Robert D. Lee, NASA/ARC | Ultrasonic Biomedical Measuring and Recording Apparatus | 3,802,253 | ARC |
| Charles A. Wagner, NASA/ARC | Rotating Raster Generator | 3,803,445 | FRC/ ARC |
| Ronald F. Reinisch, Hermilo R. Gloria, Ronald E. Goldsberry and Michael J. Adamson, NASA/ARC | Ultraviolet and Thermally Stable Polymer Compositions | 3,803,090 | ARC |
| Richard J. Parker, NASA/LeRC | Hollow Rolling Element Bearings | 3,802,753 | LeRC |
| Walter L. Cable and Harold B. Dougherty, RCA, Patent Operations, Princeton, NJ | Rotary Solenoid Shutter Drive Assembly and Rotary Inertia Damper and Stop Plate Assembly | 3,804,506 | GSFC |
| Chikara Hirayama, Westinghouse Electric Corp., Pittsburgh, PA | Glass-to-Metal Seals Comprising Relatively High Expansion Metals | 3,804,703 | LeRC |
| Jeri W. Brown, NASA/MSFC | Reduced-Gravity Fecal Collector Seat and Urinal | 3,805,303 | MSFC |
| Francisc C. Schwarz, NASA/ERC | Load Insentitive Electrical Device | 3,808,511 | LeRC |

## 1974 LAUNCH SCHEDULE

| *Name* | *Launch Date* | *Vehicle* | *Range* | *Mission/Remarks* | |
|---|---|---|---|---|---|
| Skynet II–A (UK) | Jan. 18 | Delta | ETR | Reimbursable launch. United Kingdom's communications satellite. | Launched Vehicle failure |
| Centaur Proof Flight | Feb. 11 | Titan III–E Centaur | ETR | Test flight of booster planned for Viking Mars launch in 1975. | Launched Engine failure |
| San Marco (SM–C2) | Feb. 18 | Scout | SM | United States/Italy cooperative mission to conduct air density measurements. | Launched |
| UK X–4 | Mar. 8 | Scout | WTR | Reimbursable launch. United Kingdom technology satellite with experiments related to spacecraft power systems, attitude control and stabilization. | Launched Successful |
| WESTAR–A | April 11 | Delta | ETR | Western Union communications satellite. Reimbursable launch. | Launched |
| Hawkeye (formerly Injun-F) | May 23 | Scout | WTR | To study the topology of the magnetic field at large radial distance over the Earth's dgear caps and the interaction of the solar winds with the geomagnetic field. | |
| SMS–A | May 16 | Delta | ETR | First prototype/developmental mission for geostationary meteorological operational satellite system; day and night continuous imaging of cloud cover; sophisticated remote-platform data-collection-and-weather data relay. | |
| ATS–F | May 30 | Titan III–C | ETR | Developmental and demonstrative communications mission using technology applicable to terrestrial and space needs; utilizes 9.15-meter (30-foot) deployable parabolic antenna and communications system with frequencies in several bands; will support public communications experiments in the U.S. and India. | |

## 1974 LAUNCH SCHEDULE—Cont.

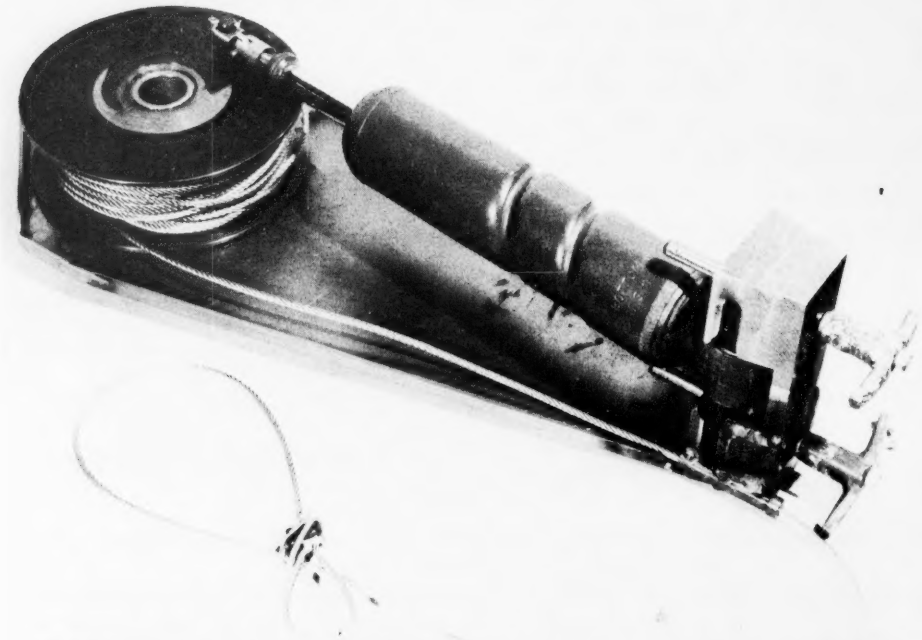
| *Name* | *Launch Date* | *Vehicle* | *Range* | *Mission/Remarks* |
|---|---|---|---|---|
| Intelsat IV F–8 .. | June ..... | A–Centaur .. | ETR ..... | One of a series of communications satellites to form part of a global communication commercial satellite system. Launch for COMSAT. |
| WESTAR–B ..... | June ..... | Delta ..... | ETR ..... | Western Union communications satellite. Reimbursable launch. |
| SMS–B ..... | July ..... | Delta ..... | ETR ..... | Second prototype/developmental mission for geostationary meteorological operational satellite system; same as SMS–A; SMS–A and SMS–B will support GARP Atlantic Tropical Experiment (GATE). |
| ITOS–G ..... | July ..... | Delta ..... | WTR ..... | Polar-orbiting operational meteorological satellite funded by NOAA; day and night cloud cover and temperature sounding. |
| AEROS–B (German) | July ..... | Scout ..... | WTR ..... | Spin-stabilized, Earth-orbiting satellite designed for upper atmosphere measurements. |
| Netherlands Sat.–A (ANS–A) | August .. | Scout ..... | WTR ..... | Designed to obtain data from celestial X-ray and ultraviolet sources. |
| GOES–A (SMS–C) | August .. | Delta ..... | ETR ..... | First Geostationary Operational Environmental Satellite, follow-on to SMS missions, funded by NOAA. |
| UK–5 ..... | August .. | ..... | ..... | To investigate galactic and extra galactic X-ray sources. |
| Helios–A | 2nd Half | Titan III | ETR ..... | To investigate the properties of and processes in interplanetary space in the direction of and close to the Sun by developing, launching and operating automated spacecraft. |
| Intelsat IV F–6 .. | 3rd Qtr. .. | ..... | ..... | One of a series of communications satellites to form part of a global communications commercial satellite system. Launch for COMSAT. |
| Skynet II–B (UK) | 3rd Qtr. .. | Delta ..... | ETR ..... | Reimbursable launch. United Kingdom communications satellite. |
| WESTAR–C ..... | October .. | Delta ..... | ETR ..... | Western Union communications satellite. Reimbursable launch. |
| Nimbus F ..... | October | Delta ..... | WTR ..... | Meteorological research and development mission to test instruments for expanding atmospheric remote sensing to cloud regions, extend observations to new spectral regions, extend sounding capabilities to higher altitudes, demonstrate feasibility for improvements to operational systems, and support GATE. |
| Comsat–A ..... | 4th Qtr. .. | Delta ..... | ETR ..... | First of two maritime communications satellites to be situated over Atlantic and Pacific Oceans. |
| Symphonie–A (French/German) | 4th Qtr. .. | Delta ..... | ETR ..... | Experimental communications satellite. Reimbursable. |
| Intelsat IV F–1 .. | 4th Qtr. .. | ..... | ..... | One of a series of communications satellites to form part of a global communication commercial satellite system. Launch for COMSAT. |
| GEOS–C ..... | (Under Study) | Delta ..... | WTR ..... | Geodynamic Experimental Ocean Satellite to demonstrate feasibility of satellite-altimeter techniques for measuring the topography of the ocean surface; can be significant contribution to understanding of ocean dynamics. |

ARE YOU GETTING YOUR

# WORTH FROM SPACE?

FOR A PENNY OF YOUR TAX DOLLAR, YOU ARE GETTING ...

## A NEW EMERGENCY FIRE ESCAPE



An eight-pound device that will minimize the nightmare of people trapped on upper floors of tall buildings, no matter how high the structures, has been developed at the Marshall Space Flight Center. It will enable them to lower themselves to the ground by means of a harness attached to a steel cable.

This emergency fire escape was prepared by Peter Broussard and John Burch of MSFC's Astrionics Laboratory.

It operates in such a manner that speed can be controlled and a constant rate of descent maintained. A 150-pound person descends at a rate of two feet per second, lighter individuals at slightly lower rates.

After an evacuee has reached a safe lower level, the device can be retracted, or extra harnesses with attached reels can be successively attached to the frame so that retraction is not necessary.

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